Ice-Related Products: Status/Issues

Sea Ice Characterization (Ice Concentration IP; Ice Age EDR)

- Ice concentration: underestimates fraction where new/young ice present. Ice extent OK.

- Distinction between first-year and multiyear ice has been dropped (now provides ice free, new/young, all other ice categories).

- Ice age retrieval:

  - interdependencies between concentration and age (confusion between new/young ice vs. low conc. ice)

  - reliance on energy balance modeling and modeled reflectances = complicated and highly dependent on external data and climatologies

$$H = \frac{\lambda_i(T_s - \theta)}{Q_\Sigma(1 - \alpha) + E_a - E_s + Q_t + Q_e} - \frac{\lambda_i h}{\lambda_s}$$

H - ice thickness (m)
T_s – surface temperature
Q_Σ - total incident s/w solar radiation
E_a – l/w radiation from the atmosphere
Q_t - turbulent heat exchange
h - snow depth (m)

λ_i - thermal conductivity of ice
θ - freezing temperature of water
α - surface albedo
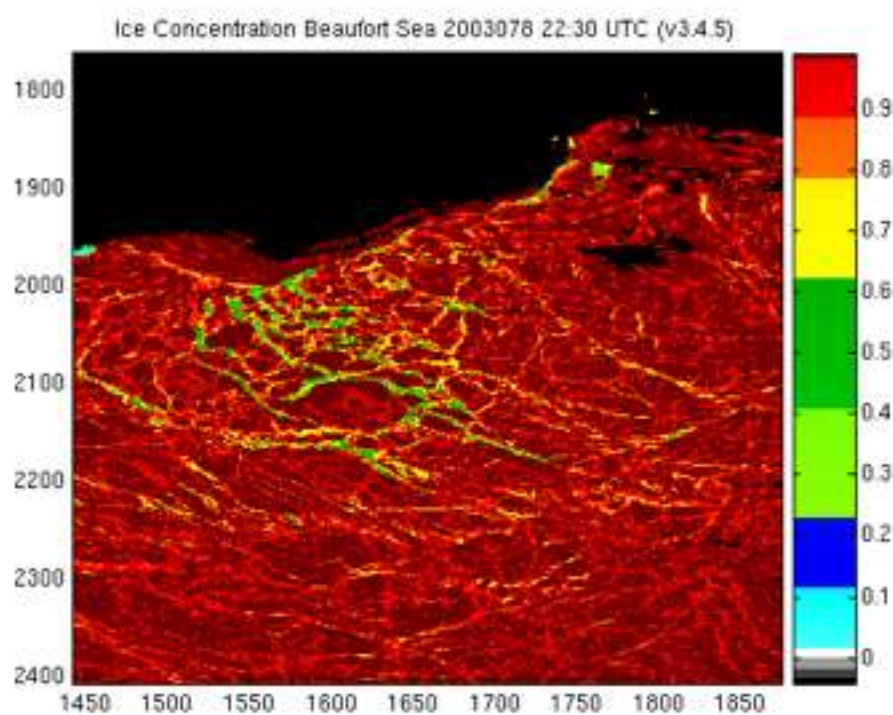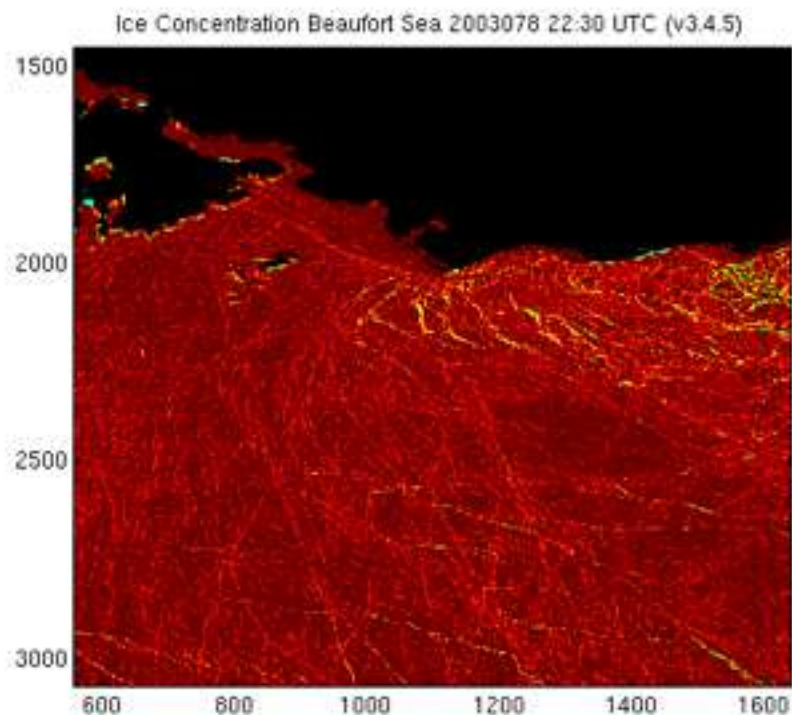E_s – long wave radiation from the surface
Q_e - heat exchange due to evaporation
λ_s - thermal conductivity of snow
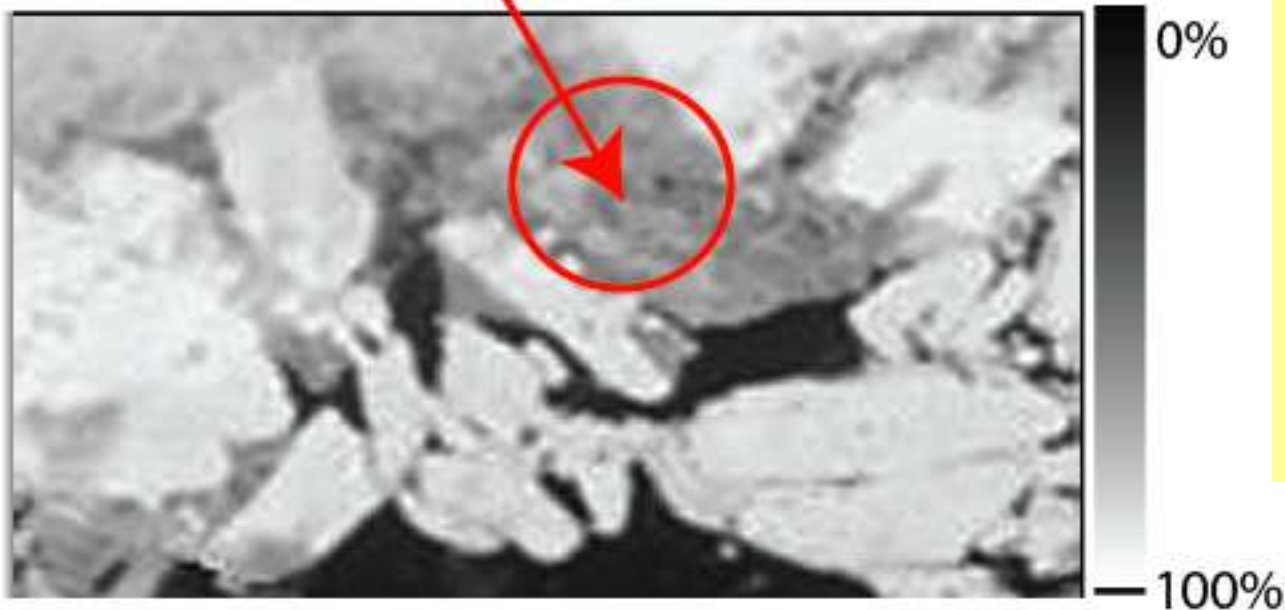
Albedo vs. snow depth:

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Ice concentration: confusion between ice concentration and ice age (new/young ice)

Ice Concentration Beaufort Sea 2003078 22:30 UTC (v3.4.5)

Ice concentration: confusion between ice concentration and ice age (new/young ice)

But, while errors can be large locally, may not exceed spec. on average due to limited coverage of new/young ice.

Other Issues:

- Verify how exclusion conditions are being applied

  - "ice vs. water temperature difference < 1.5 deg. C" would exclude nearly all ice retrievals in summer

  - "snowfall > 10cm" based on unavailable/poor data

- Ice Concentration IP needs to be archived (for cal/val at least; preferably permanent archive)

- Clarify how Ice Conc. IP and/or Snow/Ice Gridded IP are used in other algorithms (SST, ice albedo)

- Inland ice product (future)

Sea Ice Albedo EDR

- regression approach

- applied to pixels with ice concentration = was 100%, now 99%

- assumptions built into forward modeling of BRDF (e.g., soot content, snow properties, etc.)

- clarify under what VCM cloud conditions the product will be retrieved

- spec. relaxed to 0.3….

Ice Surface Temperature EDR

- dependence on ice concentration